What is claimed is:

1. A method for manufacturing a semiconductor device comprising:

forming a gate electrode on a substrate;

forming a first preliminary source/drain region with shallow junction in the substrate by performing ion implantation using the gate electrode as a mask;

forming an interlayer dielectric (ILD) pattern with contact holes over the substrate including the gate electrode and the first preliminary source/drain region, the contact holes exposing the top of the gate electrode and some part of the first preliminary source/drain region;

forming an expanded source/drain region by performing an ion implantation using the ILD pattern as a mask, the expanded source/drain region including the first preliminary source/drain region with shallow junction as the LDD region and a second preliminary source/drain region with deep junction;

forming a silicide layer on the top of the gate electrode and the expanded source/drain region; and

forming contact plugs by filling the contact holes with metal.

2. A method as defined by claim 1, further comprising forming a nitride layer with a thickness between 250Å and 350Å over the substrate including the gate electrode.

3. A method as defined by claim 1, further comprising forming a barrier metal layer on bottoms and sidewalls of the contact holes.

4. A method as defined by claim 1, wherein the silicide layer is formed by :

forming a metal layer on the top of the gate electrode and the expanded source/drain region;

performing a first thermal treatment of the substrate including the metal layer; and

performing a second thermal treatment in situ of the resulting substrate.

5. A method as defined by claim 4, wherein the metal layer is formed of at least one selected from the group consisting of a titanium layer, a titanium nitride layer, and a cobalt layer.

6. A method as defined by claim 4, wherein the metal layer is a multi-layer comprising a titanium layer and a titanium nitride layer.

7. A method as defined by claim 6, wherein the titanium layer has a thickness between 250Å and 350Å and the titanium nitride has a thickness between 100Å and 200Å.

8. A method as defined by claim 6, wherein the metal layer is treated by first and second thermal treatment processes, the first thermal treatment process using a nitrogen gas for a time between 25 seconds and 35 seconds at a temperature between 700℃ and 740℃, the second thermal treatment process using a nitrogen gas for a time between 15 seconds and 25 seconds at a temperature between 800℃ and 840℃.

9. A method as defined by claim 4, wherein the metal layer is a multi-layer comprising a cobalt layer, a titanium layer, and a titanium nitride layer.

10. A method as defined by claim 9, wherein the cobalt layer has a thickness between 120Å and 170Å, the titanium layer has a thickness between 80Å and 120Å, and the titanium nitride layer has a thickness between 130Å and 170Å.

11. A method as defined by claim 9, wherein the metal layer is treated by first and second thermal treatment processes, the first thermal treatment process using

a nitrogen gas for a time between 50 seconds and 70 seconds at a temperature between 460℃ and 500℃, the second thermal treatment process using a nitrogen gas for a time between 25 seconds and 35 seconds at a temperature between 800℃ and 840℃.

12. A method as defined by claim 1, wherein the contact plugs are formed of tungsten.